FACTSHEET NO.9

NUTRI-CHECK NET
OPTIMISING CROP NUTRITION

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Graduated Phosphorus Application

Problem

Phosphorus fertilization is often applied uniformly across entire fields, even though soil phosphorus values (Pt) can vary significantly due to differences in topography, soil texture, and cultivation history. This one-size-fits-all approach can lead to over-application in areas with high Pt, increasing the risk of phosphorus loss to the environment, while under-application in low Pt areas may limit crop yield. The lack of tools for managing this variability contributes to both inefficient phosphorus use and unnecessary environmental pressure.

Applicability box

Geographical coverage
Portugal
Application period
December 2024
Required time
1 day
Period of impact
N/A
Equipment
N/A

Solution

Graduated phosphorus application adapts fertilization to the variability within a field by using high-resolution soil sampling (recommended at 100 m intervals) and digital tools to allocate phosphorus according to crop demand. Crop management software can provide a P-redistribution model based on Pt levels, soil texture, predicted yield, and application norms, creating allocation maps that can be sent directly to farm machinery. This enables farmers to reduce phosphorus where it is not needed and increase it where deficiencies limit crop performance, achieving a more balanced and efficient nutrient strategy.

Outcome

Identified Gaps: Uniform P application wastes resources and increases environmental risk, while variability in Pt across fields is often overlooked.

Key Adoption Factors: Access to user-friendly software, affordable soil testing, and practical demonstrations of the economic and environmental benefits.

Influential Stakeholders: Farmers, advisors, software developers, and policymakers are central to ensuring the adoption of precision fertilization practices.

Farmer Willingness: Farmers are receptive when they see improved yields, cost savings, and straightforward integration with existing machinery and workflows.

Practical

Recommendations for advisors and decision-makers:

- Promote soil sampling at sufficient density (100 m) to capture field variability.
- Supporting software and similar precision tools that generate allocation maps for farm equipment.
- Encourage integration of Pt maps with P-loss risk maps (e.g., landmand.dk) to target both efficiency and environmental protection.
- Provide training for farmers and advisors to interpret maps and apply graduated fertilization strategies effectively.
- Support adoption through policies and incentives that recognize both the economic and environmental value of precision phosphorus management

Further information

- "A new graduated dosing regimen for phosphorus replacement in patients receiving nutrition support." Kaleb A Brown 1, Roland N Dickerson, Laurie M Morgan, Kathryn H Alexander, Gayle Minard, Rex O Brown

About this Factsheet

Authors: Beatriz Cardoso

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NUTRI-CHECK NET is a Horizon Europe multi-actor project establishing a self-sustaining, multi-actor, Thematic Network called "NUTRI-CHECK NET" that builds farm-level adoption of best field-specific nutrient management practices across Europe. In nine countries, farmers' Crop Nutrition Clubs will identify and share the nature of their uncertainties about crop nutrition, their challenges and barriers to change. Decision systems and nutrition tools (including commercial products, services, and recent research outputs) will be assembled by national experts across Europe, including leading farmers, into a common online NUTRI-CHECK NET platform.
Check the project website: https://nutri-checknet.eu

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